

## **REMARKS**

Applicants hereby request further consideration of the application in view of the amendments above and the comments that follow.

### **Status of the Claims**

Claims 1-30 are pending in the application. Claim 2 stands rejected under Section 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 2 stands rejected under Section 101 as overlapping two different statutory classes of invention. Claims 1-5, 8, 13, 17-18, 21-25 and 29 stand rejected under Section 102 as being anticipated by U.S. Patent No. 5,695,567 to Kordina et al. (hereinafter "Kordina"). Claims 1-5, 8-10, 12, 17 and 21-23 stand rejected under Section 102 as being anticipated by U.S. Patent No. 6,217,662 to Kong et al. (hereinafter "Kong"). Claims 6 and 7 stand rejected under Section 103 as being unpatentable over Kordina in view of U.S. Patent No. 6,406,983 to Holzlein et al. (hereinafter "Holzlein"). Claim 11 stands rejected under Section 103 as being unpatentable over Kong in view of Holzlein. Claims 14-16, 19-20 and 26-28 stand rejected under Section 103 as being unpatentable over Kordina in view of U.S. Patent No. 4,860,687 to Frijlink et al. (hereinafter "Frijlink"). Claim 30 stands rejected under Section 103 as being unpatentable over Kordina. Claims 31-42 have been withdrawn from consideration.

### **Restriction Requirement**

Applicants hereby affirm election of Group I, Claims 1-30.

### **The Rejections under Sections 112 and 101**

Claim 2 has been canceled by the present amendments.

### **The Rejections under Sections 102 and 103**

#### **Claims 1 and 3-23:**

Original Claim 1 stands rejected under Section 102 as being anticipated by Kordina. Original Claim 1 also stands rejected under Section 102 as being anticipated

by Kong. Regarding the limitations set forth in paragraph b) of Claim 1 as filed, the Action states:

Regarding eddy currents in the susceptor only and substantially no eddy current in the conductor portion, the depth of the eddy current and resultant inductive heating is a function of operating parameters like frequency of EMF, relatively permeability and resistivity of the susceptor material (See teaching reference Jancosek et al US 4845332 Col 5 lines 14-33). The structure disclosed by Kordina et al is inherently capable of this function.

As best understood, the Action likewise regards the EMF generator of Kong as being inherently capable of the recited function.

Claim 1 has been amended to recite, *inter alia*:

d) wherein eddy currents induced by the EMF generator are present in the susceptor portion and substantially no eddy currents are present in the conductor portion.

As discussed in Applicants' specification at page 10, lines 6-18, in this manner, the internal surfaces of the housing assembly (*i.e.*, the surfaces in fluid communication with the processing chamber) can be maintained at a more spatially uniform temperature so that the thermal gradients in the vicinity of the article are reduced. Restated, a more isothermal environment may be created in the processing chamber for the article such that the temperature of the portion of the housing assembly in contact with the article is at substantially the same temperature as the other surfaces defining the processing chamber. The article may therefore itself be substantially the same temperature as the surfaces defining the processing chamber. As a result, problems associated with undesirably large thermal gradients may be reduced. For example, the formation of loose deposits may be eliminated or reduced. The process (*e.g.*, an epitaxy process) may be more accurately controlled.

Kordina does not disclose a heating device as now claimed. In particular, there is no teaching or suggestion in Kordina that the generation of the Rf-field may be controlled such that substantially no eddy currents are present in the plates 16, 17.

Likewise, Kong does not disclose a heating device as now claimed. To the contrary, eddy currents are deliberately induced in both the susceptor 54 and the cylinder 57. *See, e.g.*, Kong at col. 3, lines 27-39 and col. 5, line 55-col. 6, line 9.

Nor would it have been obvious to the ordinarily skilled artisan to have operated the Kordina or Kong devices to produce a heating device as claimed. There is no apparent recognition in either reference of the benefits that may be obtained in accordance with Applicants' invention.

Accordingly, Claim 1 as amended is clearly allowable over the cited art. Claims 3-23 depend from Claim 1 and are therefore allowable as well for at least the foregoing reasons. At least certain of the dependent claims are further distinguishable from the cited art for the reasons that follow.

Claim 6 depends from Claim 1 (via Claim 3), and is directed a heating device wherein the susceptor portion includes a susceptor core of a first material and a susceptor coating "selected from the group consisting of refractory metal carbides". Claim 7 more particularly recites that the coating is TaC. As acknowledged by the Action, Kordina does not disclose a coating of TaC. Holzlein is relied upon to teach a coating of TaC on an inductive heating device. The Action contends:

Therefore it would have been obvious to one of ordinary skill in the art at the time invention was made to coat the susceptor by tantalum carbide so as to prevent migration of carbon to gas steam.

However, Claim 6 is directed to a heating device wherein the susceptor is coated with TaC, and a conductor is interposed between the susceptor and the processing chamber. By design, the coating of Holzlein interfaces with the gas stream and thereby Holzlein teaches nothing with respect to materials for use in coating a susceptor separated from a processing chamber by a conductor portion. Thus, it would not have been obvious to have modified Kordina as proposed by the Action.

Claim 14 depends from Claim 1 and further recites:

14. The heating device of Claim 13 wherein the second susceptor portion includes a platter region, the heating device further including:

a platter adapted to support the article disposed in the processing chamber and overlying the platter region; and  
an opening defined in the second liner and overlying the platter region and interposed between the platter region and the platter.

The Action acknowledges that Kordina fails to disclose a platter region and an opening in a liner, but contends that Frijlink discloses an opening and a platter in the abstract and **Figures 5a and 5b** thereof. However, no opening in a liner (the liner being interposed between a susceptor portion and a processing chamber) is apparent from the identified disclosure of Frijlink.

Claim 15 depends from Claim 14 and further recites:

15. The heating device of Claim 14 wherein the second liner includes first and second liner members disposed on opposed sides of the platter and each defining a portion of the opening, wherein the first and second liner members are separable.

While Claim 15 stands rejected under Section 103 over Kordina in view of Frijlink, no additional comments are provided in the Action. It is not apparent how either reference may be regarded as teaching or suggesting the claimed device.

Claim 16 depends from Claim 15 and further recites "wherein at least one of the first and second liner members is separable from the second susceptor portion." Accordingly, Claim 16 is further distinguishable from the cited art.

Claim 18 depends from Claim 1 (via Claim 17) and is directed to a heating device including a platter, wherein the EMF generator is configured to generate the electromagnetic field such that there are no substantial eddy currents induced in the platter by the electromagnetic field, and the platter conducts heat from the susceptor portion to the processing chamber. While Claim 18 stands rejected under Section 102 over Kordina, Kordina clearly does not anticipate this claim.

Claim 19 depends from Claim 17 and further recites "an opening defined in the conductor portion, wherein the opening is interposed between the susceptor portion and the platter." Accordingly, Claim 19 is further distinguishable from the cited art for reasons similar to those discussed above with regard to Claim 14.

**Claims 24, 25 and 29:**

Claim 24 as filed stands rejected under Section 102 over Kordina. Claim 24 has been amended to further recite:

c) wherein the liner is removable from the susceptor without requiring disassembly of the susceptor.

The provision of a liner that is removable from the susceptor without requiring disassembly of the susceptor as claimed may allow for reductions in cost of use and downtime. The liner may be cost-effectively and efficiently removed for replacement or cleaning (*e.g.*, to scrape away parasitic deposits) without requiring replacement or disassembly of the susceptor. Moreover, the liner may be removed without requiring removal of the housing assembly from a reactor assembly or disassembly of the remainder of the housing assembly.

By contrast, the plates 16, 17 of Kordina are sandwiched between the top and bottom wall pieces 13, 14 and the lateral wall pieces 11, 12 such that the susceptor must be disassembled to remove the plates 16, 17. Accordingly, Claim 24 as amended is clearly distinguishable from Kordina. Claims 25 and 29 depend from Claim 24 and are therefore allowable for at least these reasons.

**Claims 26-28:**

Claim 26 recites, *inter alia*:

wherein the susceptor includes a platter region, the housing assembly further including:

a platter adapted to support the article disposed in the processing chamber and overlying the platter region; and  
an opening defined in the liner and interposed between the platter region and the platter.

Accordingly, Claim 26 is distinguishable from the cited art for reasons similar to those set forth above with regard to Claim 14. Claims 27 and 28 depend from Claim 26 and are therefore allowable as well for at least the foregoing reasons. Claims 27



and 28 are further distinguishable for reasons similar to those set forth above with regard to Claims 15 and 16, respectively.

**Claim 30:**

Claim 30 recites, *inter alia*, "wherein the liner varies in thickness along at least a portion of its length." The Action acknowledges that Kordina does not disclose a liner of variable thickness. However, the Action contends that, because Kordina does disclose a tapered passage for gas, it would have been obvious to provide taper using the liner "since the liners define the passage of gas so as to be able to counteract a depletion of the precursor gases." However, Applicants respectfully note that this suggested reason does not provide any motivation - that is, the use of tapered susceptor pieces with liners of uniform thickness solves the problem identified by the Action. Thus, there is no teaching, suggestion or motivation apparent from the references for forming either of the plates 16, 17 with a taper. In particular, there is no suggestion or recognition of the benefits which be achieved using a heating device in accordance with Applicants' claimed invention. For example, as discussed in Applicants' specification, liners may be selected or interchanged to obtain desired gas flow characteristics. For example, the top liner 160 as described in Applicants' specification may be removed and replaced with a top liner having a differently shaped wedge portion 162 or having no wedge portion.

**New Claims 43-45:**

New Claim 43 recites a housing assembly including, *inter alia*, a susceptor and a susceptor coating, the susceptor coating being formed of a material selected from the group consisting of refractory metal carbides. Accordingly, Claim 43 is distinguishable from the cited art for reasons similar to those discussed above with regard to Claim 6. Claims 44 and 45 depend from Claim 43 and are therefore allowable as well for at least these reasons.

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**CONCLUSION**

Applicants submit that the present application is in condition for allowance and the same is earnestly solicited. Should the Examiner have any matters outstanding of resolution, he is encouraged to telephone the undersigned at 919-854-1400 for expeditious handling.

Respectfully submitted,



David D. Beatty  
Registration No. 38,071

Correspondence Address:

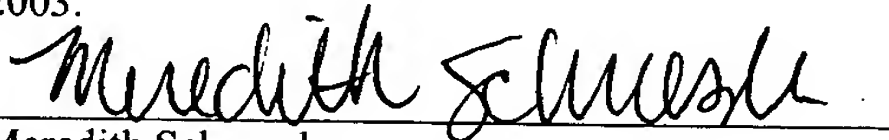


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